

ARE SPORTS DRINKS BENEFICIAL?

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Abstract: In today's world, products labeled as "sports drinks" and "energy drinks" are marketed under various names both in our country and globally. These two types of beverages are often confused with each other, and as a result, many individuals-particularly children-are adversely affected. The widespread and sometimes uninformed use of these drinks among both children and adults creates a potential for misuse, which may even be encouraged by parents who lack sufficient knowledge about their effects. Moreover, there is a lack of clarity on this issue within the sports community itself. The determination of which beverage is genuinely beneficial is often left to the discretion of the marketers. Even when the appropriate product is selected, information regarding the correct usage-depending on exercise intensity and duration-remains extremely limited. Although interest in natural products has increased worldwide and in our country in recent years, the question arises: What is the effective or safe dose of these products? Another critical question is whether these drinks are truly beneficial, and if so, to what extent and under what conditions. This review aims to contribute to the scientific understanding of proper product selection by examining the brief history, composition, and characteristics of sports drinks.

Keywords: Sports drinks, energy drinks, benefits, performance enhancement.

Introduction

Sport is a form of physical activity that requires high energy expenditure and has been scientifically proven to be beneficial for health when performed under proper conditions. Today, many professional and amateur athletes use a variety of legally permitted ergogenic aids to maintain performance, reduce fatigue, enhance concentration, achieve mental stimulation, and restore electrolyte balance lost through exercise.

Among these aids, "sports drinks" and "energy drinks," which dominate a large portion of the commercial market, have always attracted considerable attention, mainly because they are consumed as liquids and thus perceived as more convenient and harmless compared to other supplements. However, these two types of beverages, which serve fundamentally different purposes, are often confused and even used interchangeably. Whether sports drinks are truly beneficial, which types provide benefits, and under what nutritional conditions they should be consumed remain matters of debate. In this study, the definition, characteristics, role in sports nutrition, and potential benefits of sports drinks are discussed [1].

Sports drinks differ fundamentally from energy drinks, and these terms should not be used interchangeably. Sports drinks are flavored beverages designed to assist in fluid intake before, during, or after exercise. They typically contain carbohydrates, minerals, electrolytes (e.g., sodium, potassium, calcium, magnesium), and sometimes vitamins or other nutrients. Energy drinks, on the other hand, as the name suggests, are beverages formulated to provide "energy" or caloric intake. These typically contain varying amounts of carbohydrates, proteins, amino acids, vitamins, sodium, and other minerals, along with stimulants such as caffeine and guarana.

In the context of sports, sports drinks are consumed to deliver optimal fluids and carbohydrates during exercise, facilitate post-exercise rehydration, and replenish energy stores after training. Energy drinks, however, are not formulated for rehydration; instead, their caffeine content is reported to provide a sudden increase in alertness and perceived energy [2].

Interest in energy-providing beverages in sports can be traced back to the early 19th century. During that period, some athletes even experimented with low-alcohol beer as a means of hydration and energy replacement, as the boiling process involved in beer production sterilized the liquid, making it safer to consume than water from unknown sources. However, subsequent scientific findings revealed that even small doses of ethanol reduce endurance performance, inhibit hepatic glucose output during exercise, and impair psychomotor function-negatively affecting reaction time, hand-eye coordination, and balance. In 1909, James E. Sullivan, President of the Amateur Athletic Union of the United States (AAU), criticized the eating and drinking habits of certain well-known athletes before a marathon and proposed the “exercise without food” model, suggesting that athletes should rely more on ergogenic aids than on traditional nutrition. Later scientific research, however, emphasized the importance of proper nutrient timing for athletic performance, leading to the abandonment of this approach.

What Are Sports Drinks?

Sports drinks are specially formulated beverages designed to help individuals rehydrate during or after exercise by replenishing essential minerals such as sodium, potassium, chloride, calcium, phosphate, and magnesium that are lost through sweating. During prolonged exercise lasting more than one hour, the body loses micronutrients-including sodium, potassium, and chloride-that cannot be replaced by water alone. In addition to maintaining hydration, sports drinks play a role in improving athletic performance, preventing certain health conditions, and strengthening the immune system [3].

Their formulations can be developed to enhance energy, increase mental focus, and reduce joint or bone pain. These properties have contributed to the growing popularity of sports drinks among consumers. Generally, they are rich in carbohydrates, which are considered the most efficient source of energy. Along with carbohydrates-essential for maintaining exercise and sports performance-sports drinks typically contain sweeteners, preservatives, vitamins, and amino acids. Amino acids help delay the onset of fatigue and improve muscle function during exercise. B vitamins contribute to accelerating metabolism and energy production, while carbohydrates provide rapid energy and replenish depleted energy reserves after activity. Electrolytes, on the other hand, are crucial for regeneration in individuals with diabetes who are at risk of dehydration due to elevated blood glucose levels. Depending on their fluid, carbohydrate, and electrolyte composition, sports drinks are classified into three main types:

Table 1.
Composition of different types of sports drinks

Type of Drink	Main Components
Isotonic Drinks	Electrolytes + 6–8% Carbohydrates
Hypotonic Drinks	Electrolytes + Low Level of Carbohydrates
Hypertonic Drinks	High Level of Carbohydrates

Risk of water intoxication in sports

Although water is the most essential element for maintaining hydration and sustaining vital bodily functions, excessive consumption can lead to electrolyte imbalances. This condition, known as water intoxication or hyponatremia (serum sodium concentration <130 mmol/L), is rare but can be life-threatening. It occurs when large amounts of plain water are consumed to replace fluids and electrolytes-particularly sodium-lost through heavy sweating caused by hot weather, exercise, or a combination of both. To prevent such cases, it is necessary to replenish electrolytes such as sodium and potassium to restore the body's electrolyte balance. The American College of Sports Medicine (ACSM) recommends the use of hypertonic sports drinks containing 0.5–0.7 g of sodium per liter during exercises lasting longer than one hour, as they help reduce the risk of hyponatremia. Sodium added to sports drinks helps maintain plasma osmolality while reducing urine output [4].

Why is the right sports drink selection important?

Traditionally, isotonic sports drinks consumed in small quantities during short-term physical activities have yielded highly effective results. However, during prolonged and intense exercise, athletes experience increased sweating, leading to greater electrolyte loss and higher demands for components such as sodium-making isotonic drinks insufficient. During long and high-sweat endurance events, the body's need for balance, fluids, and salts cannot be met solely through carbohydrates, as in shorter and more intense exercises. In such cases, serious dehydration or electrolyte depletion may occur, often accompanied by gastrointestinal discomfort that can negatively impact athletic performance. Many endurance athletes refer to this condition as “digestive distress”, where the gastrointestinal tract becomes overwhelmed by high sugar levels in the beverage. Once this threshold is crossed, the athlete may feel bloated, nauseous, and uncomfortable. To avoid this, most athletes, typically through trial and error, dilute isotonic drinks with water-particularly during longer sessions or hot weather-effectively creating hypotonic beverages (i.e., with lower solute concentration than blood plasma). This practice allows for greater fluid intake and more balanced hydration, partially alleviating dehydration issues. However, dilution also reduces the already minimal electrolyte content of these drinks, sometimes to negligible levels. Therefore, modern hypotonic sports drinks, formulated with lower carbohydrate concentrations (reduced from 6% to 3%) and higher electrolyte content, have become increasingly preferred [5].

Table 2.

Composition of Selected Sports Drinks Produced in the United States

Product Name	Manufacturer	Calories (kcal)	Carbohydrates (g)	Sodium (mg)	Potassium (mg)	Vitamins	Minerals
All Sport Quencher	Body All Sport Inc	60	16	55	60	C	
All Sport Quencher–Zero	Body All Sport Inc	0	0	55	60	B3, B5, B6, B12	

Gatorade Propel	Pepsico Inc	50	14	110	30		
Gatorade Endurance	Pepsico Inc	10	3	35		B3, B5, B6, B12, E, C	Calcium, Magnesium
Gatorade G2	Pepsico Inc	50	14	200	90	B3, B6, B12	
Powerade Zero	Coca-Cola Co	0	0	100	25	B3, B5, B6, B12	
Powerade	Coca-Cola Co	78	19	54			Iron
Powerade Ion 4	Coca-Cola Co	50	14	100	25	B3, B5, B6, B12	
Accelerade		80	15	120	15	E	Calcium, Protein

When should sports drinks be consumed?

1. Before Exercise: Sports drinks can be used by athletes to fine-tune fluid and fuel intake. The sodium contained in these drinks helps reduce urine loss before exercise, while carbohydrates increase muscle glycogen levels, which are used as fuel during activity. To maintain normal body fluid balance, it is recommended to consume 5 – 7 mL of fluid per kilogram of body weight approximately 3 – 4 hours before exercise. Depending on the duration and intensity of the activity, carbohydrate- or electrolyte-rich sports drinks may be consumed prior to exercise.

2. During Exercise: Sports drinks are primarily designed to provide optimal fluid and energy delivery during exercise. They help athletes maintain performance for longer periods and at higher intensity levels. Therefore, when exercise exceeds one hour or involves intense and intermittent activity, sports drinks offer greater benefits compared to plain water.

3. Recovery (Post Exercise): Sports drinks aid in replacing fluids lost through sweat, supporting individual athletes' nutritional recovery goals, and replenishing glycogen stores in muscles. During vigorous physical activity that requires rehydration, drinks with a higher sodium content are particularly beneficial. To achieve complete recovery, sports drinks should be consumed together with other foods containing protein, carbohydrates, and fluids [6].

Other beverages used instead of sports drinks

1. Sports water: This is a popular beverage for those who prefer drinking water during exercise. It is lightly flavored and generally contains lower amounts of carbohydrates and electrolytes than traditional sports drinks. It is suitable for short-term, moderate-intensity exercise (<60 minutes).

2. Water: Voluntary fluid intake of water may be a better option compared to flavored beverages. Water is particularly beneficial for low-intensity or short-duration exercise (<45 minutes) or when consumed alongside sports drinks.

3. Cordials / Non-alcoholic beverages / Fruit juices: Compared with sports drinks, these beverages usually have higher carbohydrate concentrations but lower electrolyte content.

Beverages with high carbon dioxide levels reduce fluid intake and may cause intestinal gas; therefore, they are not recommended [7].

4. Energy drinks: Energy drinks generally contain very high carbohydrate concentrations and include additives such as vitamins, taurine, and glucuronolactone. Recent studies have shown that these additives have no proven effect on sports performance. However, for maintaining exercise performance, the inclusion of low-to-moderate caffeine levels (75–200 mg) in a beverage can be beneficial without negatively affecting hydration status [8].

Which sports drink and when should it be used?

As discussed above, sports drinks have different characteristics depending on their composition and intended use. Numerous studies have investigated the effects of hypotonic and isotonic sports drinks on athletes' endurance and physiology. Indeed, optimizing carbohydrate and salt concentrations to enhance performance has long been a fundamental approach for sports nutrition specialists and beverage manufacturers. Previous studies have shown that carbohydrate intake during prolonged exercise helps maintain plasma glucose concentrations and has fatigue-delaying effects. Although the carbohydrate and salt levels in a beverage can be increased to allow greater intake, this approach reduces gastric emptying rate. Consequently, hypertonic drinks may draw water from circulation into the intestine, thereby impairing performance. For this reason, many studies have focused on isotonic solutions; however, this should not always be considered the optimal choice. Several studies have also included hypotonic solutions, which have shown some promising results, though further research is still needed to confirm their efficacy [9].

Conclusion

As described above, sports drinks differ from energy drinks and are specifically developed as ergogenic aids to support athletic performance. However, the use of these products—each with different formulations—should be approached with caution.

The most critical factor in choosing a sports drink is to consider the individual characteristics of the athlete as well as the intensity, duration, and nature of the physical activity. The dose and timing of consumption should be accurately calculated in conjunction with the athlete's diet. In this sense, while these drinks can enhance physical performance, improper timing or inappropriate product selection can pose health risks.

Undoubtedly, professional guidance is essential in this regard. The recent development of antioxidant-enriched isotonic sports drinks represents an important advancement, and future optimization studies may contribute to more accurate product selection.

Moreover, following the European Food Safety Authority (EFSA)'s recent initiatives on food safety legislation, it is crucial for our country to implement similar measures and raise awareness within the sports community. In this context, close monitoring and enforcement of the Regulation on Dietary Supplements by the Ministry of Agriculture and Forestry are of paramount importance for both public and athlete health.

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